

## REGISTRATION OF SIX GERMPLASM LINES OF RICE<sup>1</sup>

(Reg. No. GP 36 to GP 41)

J. N. Rutger, K. W. Foster, K. S. McKenzie, D. J. Mackill,  
M. L. Peterson, and C. H. Hu<sup>2</sup>

THREE short stature and two early maturing rice (*Oryza sativa* L.) lines originated as induced mutants from the cultivars 'Calrose' or 'Colusa'. A fourth short stature line arose as a double dwarf F<sub>2</sub> recombinant from a cross between two induced mutant semidwarfs. The parent cultivars have been described (1) and were grown extensively in California. Each mutant was selected in 1971 at Davis, Calif, as a single M<sub>2</sub> plant grown from seed exposed to Cobalt-60 gamma radiation.

Short stature mutant D66 came from the same 25 kR-treated seed lot that gave rise to 'Calrose 76' (5). D66 is about 16 cm shorter than Calrose but about 9 cm taller than Calrose 76 (Table 1). D66 carries a recessive gene for short stature, which is non-allelic and unlinked to the short stature gene in Calrose 76 (2). Since the Calrose 76 gene for short stature is allelic to the short stature gene in the tropical cultivars 'IR8' and 'Dee-Geo-Woo-Gen', the non-allelic D66 source may help reduce genetic vulnerability for short stature. D66 is about 3 days later than Calrose and Calrose 76 in maturity. D66 yielded 7,170 kg/ha compared to 9,010 kg/ha for Calrose 76 in three replicated yield tests conducted cooperatively with U.C. Cooperative Extension and California Cooperative Rice Research Foundation (CCRRF) in 1973.

Short stature mutant D24 came from a 20 kR-treated Calrose population (6). D24 is about 18 cm shorter than Calrose but about 7 cm taller than Calrose 76 (Table 1). D24 is also about 8 days earlier than Calrose and has about 20% smaller grains (22 mg/paddy kernel for D24 vs. 27 mg for Calrose). Its earlier maturity and smaller kernel size distinguishes D24 from D66, which is similar in height. Short stature in D24 is controlled by a single, recessive gene with pleiotropic effects for early maturity and small kernel size. The short stature gene in D24 is non-allelic and unlinked to the short stature genes in Calrose 76 and D66 (3). D24 yielded 7,870 kg/ha, compared to 8,130 kg/ha for Calrose 76 in nine replicated yield tests conducted cooperatively with U. C. Cooperative Extension and CCRRF in 1973-74.

Short stature mutant D38 came from a 20 kR-treated Colusa population (6). D38 is both shorter and earlier than Colusa (Table 1). D38 carries a recessive gene for short stature. Its relationship to other short stature genes is unknown. D38 grains generally are more chalky than Colusa grains. D38 yielded 7,620 kg/ha compared to 8,030 kg/ha for the check cultivar 'S6' in two replicated yield tests conducted cooperatively with U.C. Cooperative Extension and CCRRF in 1973.

Double Dwarf 1 (DD1) is a recombinant from Calrose 76/D66 which possesses both short stature genes from its parents. DD1 is 10 cm shorter than Calrose 76 and about 19 cm shorter than D66. Maturity is intermediate to that of its parents. In a preliminary yield test, DD1 yielded 5,120 kg/ha compared to 6,920 kg/ha for Calrose 76.

Early maturing mutants D18 and D31 came from the same 25 kR-treated seed lot which produced Calrose 76. D18 is about 15 days earlier than Calrose and 2 days earlier than 'Earlirose' (Table 1). In contrast to its parent, D18 is relatively insensitive to photoperiod. Height and other characteristics of D18 are similar to those of Calrose. D18 carries a single, weakly-dominant gene for early maturity. The early maturity gene in D18 is independent of the short stature gene in Calrose 76 and the glabrous hull gene in 'CS-M3' (4). D18 yielded 8,510 kg/ha compared to 8,710 kg/ha for Earlirose in two replicated yield tests conducted cooperatively with U.C. Cooperative Extension and CCRRF in 1974.

D31 is about 22 days earlier than Calrose and about 9 days earlier than Earlirose (Table 1). D31 is relatively photoperiod insensitive. Height and other characteristics of D31 are similar to those of Calrose. Preliminary evidence indicates that D31 may also carry a single gene for early maturity. Its relationship to the D18 gene for early maturity is not known. D31 yielded 7,170 kg/ha, compared to 8,710 kg/ha for Earlirose, in two replicated yield tests in 1974.

These short stature and early maturing germplasm lines are useful parental lines for rice breeding programs for temperate environments. They were jointly released on 1 May 1977, by AR, SEA, USDA, the California Agricultural Experiment Station, and CCRRF. Germplasm amounts of seed (< 10 g) of the above lines may be obtained by writing to: Germplasm Resources Laboratory, AR, SEA, USDA, NER, Bldg. 046, BARC-West, Beltsville, MD 20705.

## REFERENCES

1. Johnston, T. H. 1958. Registration of rice varieties. *Agron. J.* 50:694-700.
2. Foster, K. F., and J. N. Rutger. 1978. Independent segregation of semidwarfing genes and a gene for pubescence in rice. *J. Hered.* 69:137-138.
3. MacKil, D. J., and J. N. Rutger. 1979. Inheritance of induced-mutant semidwarfing genes in rice. Submitted for publication.
4. McKenzie, K. S., J. E. Board, K. W. Foster, and J. N. Rutger. 1978. Inheritance of heading date of an induced mutant for early maturity in rice. SABRAO J. (In press).
5. Rutger, J. N., M. L. Peterson, and C. H. Hu. 1977. Registration of Calrose 76 rice. *Crop Sci.* 17:978.
6. ———, ———, and W. F. Lehman. 1976. Induction of useful short stature and early maturing mutants in two japonica rice cultivars. *Crop Sci.* 16:631-635.

<sup>1</sup> Registered by the Crop Science Society of America. Cooperative investigations by AR, SEA, USDA; the California Agric. Exp. Stn.; and the California Coop. Rice Res. Found., Inc. Accepted 22 Jan. 1979.

<sup>2</sup> Research geneticist, AR, SEA, USDA, Davis, CA 95616; former graduate students; professor; former visiting scientist, Dep. of Agronomy and Range Science, Univ. of California, Davis.

**Table 1. Characteristics of four short stature and two early maturing rice germplasm lines and parental cultivars grown at Davis, Calif.**

Registration no.	Genotype	CI no.	Ancestry	Grain type	Days from seedling to heading	Plant height	Desirable attribute(s)
						cm	
GP36	D66	11033	Calrose mutant	Medium	115	104	Short stature
GP37	D24	11034	Calrose mutant	Medium	104	102	Short stature, earliness
GP38	DD1	11036	Calrose 76/D66	Medium	113	85	Short stature
GP39	D18	11037	Calrose mutant	medium	97	118	Earliness
GP40	D31	11038	Calrose mutant	Medium	90	114	Earliness
No. 45	Calrose 76 (check)	9966		Medium	112	95	
No. 6	Calrose (check)	8988		Medium	112	120	
-	Earlirose (check)	9672		Medium	99	120	
GP41	D38	11035	Colusa mutant	Short	94	95	Short stature, earliness
No. 8	Colusa (check)	1600		Short	105	119	